

**WGS REACTOR INCORPORATED WITH CATALYZED HEAT EXCHANGER  
FOR WGS REACTOR VOLUME REDUCTION**

**ABSTRACT OF THE DISCLOSURE**

A heat exchanger (60) for a fuel processing system (10) that produces a hydrogen reformate gas. The heat exchanger (60) includes a catalyst for converting carbon monoxide to carbon dioxide. The heat exchanger (60) can be any suitable heat exchanger, such as a tube and fin type heat exchanger, that is able to cool the reformate gas and includes a suitable surface on which the catalyst can be coated. In one embodiment, the heat exchanger (60) is part of a WGS reactor assembly (48). The WGS reactor assembly (48) includes a first stage WGS adiabatic reactor (52) followed by the catalyzed heat exchanger (60) and a second stage WGS adiabatic reactor (68). Also, in one embodiment, both the first stage and the second stage WGS reactors (52, 68) are medium temperature reactors. By catalyzing the heat exchanger (60) in the WGS reactor assembly (48), the assembly (48) can be smaller than what is currently known in the art.